





## USGS NSF GRIP Opportunity

● <b>USGS Center:</b>	Crustal Geophysics and Geochemistry
● <b>Project Title:</b>	Geophysical studies into the architecture of large igneous systems hosting magmatic ore deposits
● <b>Project Hypothesis or Objectives:</b>	Exploring for the critical platinum-group elements (PGEs) relies upon understanding the geophysical signature of the entire magmatic system in which they form, from bottom to top. The USGS is applying a range of geophysical techniques to investigate the internal architecture of layered mafic intrusions. This work also considers the regional geologic framework for these intrusions, emphasizing feeder zones, crustal architecture and external sources of sulfur that exist in basement rocks. Expertise is needed in integrating existing geophysical data sets over specific intrusions within the Mid-continent rift system in order to understand the relation of various layered mafic intrusions to the rift.
● <b>Duration:</b>	9-12 months
● <b>Internship Location:</b>	Denver, CO
● <b>Area of Discipline:</b>	Geophysics, Geology, Earth Science, Remote Sensing, Tectonics, Economic Geology, Mineral Deposits
● <b>Expected Outcome:</b>	This research will investigate the internal architecture of layered intrusions by identifying layering and estimating extent, and considers the regional geologic framework for these intrusions, emphasizing feeder zones, crustal architecture and external sources of sulfur that exist in basement rocks. A GIS type data base of existing geological and geophysical data for some or all of the intrusions and selected geophysical images and models will inform assessments of the potential for PGEs and understanding of the environments in which they form. The intern will be able to acquire skills unique to the USGS—the experience of interpreting magnetic and electromagnetic data in rugged, magnetic and resistive terrain, will gain experience in software that are industry standards (e.g. ArcGIS, Oasis Montaj) as well as stochastic inversions developed at the USGS. In addition, the intern will gain understanding of layered mafic intrusions and their relation to mineral deposits and tectonic processes. The USGS will benefit by having help advancing project

work by talented young scientists who will bring new ideas and enthusiasm.

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|  <b>Special skills/training Required:</b> | Completion of a bachelor's or master's degree in geophysics or a related field. Experience in data integration (e.g. ArcGIS), processing (e.g. MATLAB, Oasis Montaj), including electromagnetic and/or magnetic data inversion is desirable, but not required. Applicant should have at least basic programming experience and ability to learn software packages independently.  |
|  <b>Duties/Responsibilities:</b>          | Integrate existing geological data (digital maps, well data, sample locations), topographic (LIDAR, SRTM), remote sensing (e.g. Landsat, AVIRIS, etc.) and geophysical (gravity, magnetic, electromagnetic, seismic, etc.) into a GIS. Process existing geophysical data when necessary (e.g. in MATLAB, Oasis Montaj) and invert the data, constrained by geologic and other geophysical information, to determine the size of the intrusion and identify layering, faults, dikes and locations of sulfides. Work with USGS geologists, economic geologists and geophysicists in the interpretation of these data. |
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